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A RAPID EVIDENCE ASSESSMENT TO ASSESS THE OUTCOMES OF COMMUNITY AND CUSTODY DELIVERED VOCATIONAL TRAINING AND EMPLOYMENT PROGRAMMES ON REOFFENDING

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Abstract

We undertook a Rapid Evidence Assessment to assess the outcomes of vocational training and employment programmes on reoffending. A meta-analysis of a subset of the most methodologically robust studies found that vocational training and employment programmes were associated with 9 percent fewer programme participants reoffending, when compared with nonparticipants. Studies conducted in the UK were associated with 6 percent fewer programme participants reoffending. However the expected high degree of observed statistical heterogeneity amongst the analysed studies suggests considerable variation in programme effects on recidivism outcomes. It is also possible that publication bias inherent in the reviewed studies may mean that in real terms reductions in recidivism would be marginally lower than our headline findings suggest. This is the first review of this type to combine a review of custodial and community settings, to include a meta-analysis, and to include a number of UK studies.

Keywords

Rapid Evidence Assessment, vocational training, employment, offender

Introduction

Criminological theory (for example, Merton 1938, Agnew 1992 and Hirschi 1969) and evidence from longitudinal studies (e.g. Sampson and Laub 1995) has long suggested that employment is a factor in explaining offending behaviour. Finding sustained employment is also understood as a component in the process of desisting from crime (for example, Uggen, 2000, Maruna, 2001). Employment performs a number of functions in the rehabilitation process:

“A good job not only provides the means for basic survival, but also is a key element in rebuilding self-esteem, attachment to a conventional lifestyle, and a sense of belonging in the community. Work organizes daily behavior and patterns of interaction, and becomes an important source of informal social control for exoffenders . . .” (Visher et al. 2005: 295-6).

With this in mind, vocational training and employment programmes have long been implemented in both custodial and community settings to support rehabilitation. These take a number of forms including ‘work readiness’ and ‘job readiness’ courses, which often include a number of elements such as basic educational skills (literacy and numeracy), life skills, CV preparation and interview skills training. Such programmes often include work placement or work experience components.

However, the evidence base for such programmes is limited. A review in 2000 (Wilson et al. 2000) found much of the evidence was methodologically poor and therefore the authors were very cautious in their conclusions. A review by Visher et al. (2005) of programmes in community settings also criticised the methodological rigour of available studies and found that the impact of job training and employment programmes on criminal recidivism was minimal. A more recent review by Newton et al. (2018) focused on more methodologically robust studies but as a result included only a few studies, all from the US, and concluded that there was insufficient data from

which to draw any firm conclusions about the effectiveness of the interventions examined. Given the continued interest of policy-makers in the UK in vocational training and employment programmes the limitations in the current evidence base are problematic.

The aim of this Rapid Evidence Assessment (REA) was to assess the outcomes of community and custody delivered vocational training and employment programmes on reoffending. It builds on previous systematic reviews, but tries to strike a different balance between excluding methodologically weak empirical studies whilst also being as inclusive as possible. In particular, this review includes published UK studies in an effort to provide more useful insights for UK policy-makers.

A Rapid Evidence Assessment (REA) is a form of academic systematic review, usually undertaken intensively over a relatively short period of time (in this case approximately four months). REAs are often used to understand the impact of a particular issue or intervention, in order to produce evidence that may inform policy and practice (Government Social Research Unit 2007).

We first set out relevant context to the review including a more detailed look at previously published reviews, before going on to describe the REA methodology and then the findings from the review. We finish with some conclusions aimed at policy-makers and researchers.

Context

Unemployment and rehabilitation for people who offend

The employment rate (measured by the Labour Force Survey, and based on the number of people in the UK over the age of 16 who did at least one hour of paid work) was 76 per cent in 2019 (Office for National Statistics 2019). Administrative data from the Department for Work and Pensions and the Ministry of Justice relating to 2010/11 suggest that two-thirds of prisoners are unemployed both before and after custody and that 13 per cent have never had a job (Brunton-Smith and Hopkins 2014). Moreover, of the 2,171 prisoners serving sentences between 18 months and four years included in the SPCR (Surveying Prisoner Crime Reduction) undertaken between 2005 and 2010, suggested just 31 per cent reported had been in paid employment since their release (Brunton-Smith and Hopkins, 2014). Similar figures have been found in the USA where nationally representative datasets analysed by demographers estimate that 27 per cent of formerly incarcerated individuals tend to be unemployed (Shannon et al. 2017).

In the UK two thirds of all prisoners and half of those serving community sentences are assessed as having problems in the area of employment, education, and training (Harper and Chitty 2005). Ex-offenders face significant challenges when seeking employment. Many of them face job specific issues including skills shortage and lack of experience that place them at a disadvantage in a competitive labour market. In addition, ex-offenders are increasingly likely to be susceptible to negative social factors including mental and physical disabilities, substance use dependency or educational deficits (Graffam et al. 2014). Other exogenous factors may include the economic fluctuations such as recessions and/or changing labour market requirements and skills that, as in the case of covid-19, disproportionately affect low paid workers and temporary/insecure jobs in sectors such as hospitality where ex-offenders may typically seek employment opportunities (Cominetti, 2020).

Research by the Ministry of Justice has indicated that ex-offenders who gain employment at some point in the year following release from prison are significantly less likely to re-offend when compared to those who do not (Ministry of Justice 2013). Estimates are that work leads to a 20 per cent reduction in likelihood of further offending (*ibid.*). The costs associated with reoffending are high, the MOJ estimate that reoffending in the UK by those released from custody costs around £15 billion per year and that employment related support is key in reducing this figure (Ministry of Justice 2018).

The UK government has acknowledged the benefits of training and employment for people in the criminal justice system and has embarked on a range of policy initiatives including payment-for-results welfare-to-work programme launched throughout Great Britain in June 2011 under the 2010-2015 coalition government. The Work Programme sought to commission organisations to provide employability and training services with the aim of getting the long-term unemployed into work, this included incentives to reduce reoffending by working with individuals who have experienced prison and/or drug and alcohol problems (Department for Work and Pensions 2011). A parliamentary enquiry suggested that the programme had struggled to improve the outcomes of harder-to-help groups including those with criminal records and that the payment by result structure failed

to deliver outcomes – the programme was discontinued in 2017 (House of Commons 2014).

An inspection in 2016 concluded that education in prison needed to be given a higher priority and suggested a need to ensure more purposeful activity and a focus on ensuring that qualifications were relevant to the labour market (HM Inspectorate of Prisons, 2016). Following the results of the inspection Justice Secretary David Gauke launched *The Education and Employment Strategy* in 2018, an initiative that aimed to boost prisoners' skills and encourage work upon release. The initiative included a vision to put offenders sentenced to prison immediately on the path to employment by creating a prison education system that complemented prison work and is orientated towards employment upon release (Ministry of Justice, 2018). Other aspects of the plan included giving greater control to governors to tailor education to prisoners needs and to ensure training was aligned to labour market requirements. In his first ministerial speech Justice Secretary Robert Buckland made reference to *The Education and Employment Strategy* by highlighting the need for partnerships between prisons and employers to ensure suitable skills are being developed in order to meet business needs and to ease the path from prison to employment (Buckland, 2019).

The existing evidence-base

This Rapid Evidence Assessment builds on three previous systematic reviews.

Wilson et al. (2000) carried out a meta-analysis of educational, work, and vocational programmes for offenders either in prison or jail, or participating in a corrections-based programme. A total of 33 studies were selected for inclusion; the majority were quasi-experimental evaluations and three used random assignment. However, approximately nine out of 10 studies were rated as methodologically poor and Wilson et al. were therefore very cautious about drawing firm conclusions. Nevertheless, they found that education, vocation and work programmes reduced recidivism. Recidivism was lower among participants involved in education, work, and vocational programmes (39%) compared to participants not involved in these programmes (50%). Future employment was also higher among participants. Effect sizes demonstrated that programme effectiveness ranged from very high, to minimal or no effect on recidivism.

Visher et al. (2005) carried out a meta-analysis of educational, work, and vocational programmes for individuals with a criminal record and who were not in custody, where the outcome measured was recidivism (primarily arrest data taken from official records or self-report). The interventions included employment assistance, job placement, job training programmes, and academic, vocational, and basic skills education components. Some programmes involved components such as substance abuse reduction services. All studies were conducted in the USA and followed random assignment procedures. Visher and colleagues found that the impact of job training and employment programmes on criminal recidivism was minimal.

Newton et al. (2018) carried out a systematic review of evaluations of post-release vocational training and employment programmes for adult offenders where the outcome measured was recidivism. They included community-based or prison-based programmes that included a job placement, job training, or a vocational education/training component (although other components may have also been included). Their review considered evaluations that incorporated experimental or quasi-experimental designs. They identified 12 studies that reported data from seven independent evaluations, all in the US. Newton and colleagues found that there were insufficient data from which to draw any firm conclusions about effectiveness of the interventions they examined, and due to the heterogeneity of included studies they didn't undertake a meta-analysis. Their tentative conclusion was that there is a lack of empirical support linking programme participation with subsequent employment success. Programmes that offered transitional jobs demonstrated short-term gains in employment compared to comparison groups, but these gains tended not to be sustained when people tried to transition to unsupported jobs. There was some evidence to indicate that programmes were most effective for ex-offenders who posed a high risk of recidivism and that older offenders (27 years and above) benefited more from employment interventions. Also, when offered in isolation from other services, there was reason to suspect that employment readiness programmes would be ineffective.

Methodology

The REA was guided by the research question: '*what is the effect community and custody delivered vocational training and employment programs on reoffending?*' We were interested to understand the empirical evidence associated with community and custody delivered vocational training and employment programmes and

reoffending outcomes.

Scope

We defined the scope of the REA using the PICOS criteria (Campbell Collaboration, 2014), searching for studies published in English since 2000.

Population: Only studies involving adult participants who are in custody, released from prison under probation supervision or offenders given a community sentence were eligible for inclusion. Since offenders in England and Wales under the age of 18 are in the care of youth offending services, only studies where some or all of the participants were aged 18 or over were included. Although we were interested to explore Newton et al's (2018) tentative finding about older offenders benefiting more from employment interventions, we were not able to extract data from our primary studies to determine this.

Intervention: Vocational education, vocational training, work placements and employment programmes including 'work readiness' and 'job readiness' courses were in scope. Work/job readiness programmes can include a number of elements such as basic educational skills (literacy and numeracy), life skills, CV preparation and interview skills training. They often include a work placement or work experience element. Stand-alone education programmes without an immediate employment focus were excluded.

Comparison involved: We included studies that involved any comparison group, subject to study design (see Table 1).

Outcomes: We included studies where the primary outcome was a measure of recidivism such as arrests, convictions (binary, frequency, severity), or breaches of condition (e.g. recalls to custody or return to court). We initially also looked for studies that included a range of 'intermediate outcomes' including gaining employment, sustaining employment and access to further or higher education. This ensured that we did not miss any studies where a recidivism outcome was included but not reported in headline findings. Studies that, on closer reading, included an intermediate outcome, but no measure of recidivism were later screened out.

Study designs. The selection of studies was limited to empirical impact evaluations that adopted experimental and quasi-experimental designs. We included studies using unmatched comparison groups as we had anticipated a shortage of evaluations with experimental and quasi-experimental designs. The included studies therefore correspond to levels 3 to 5 on the Maryland Scientific Methods Scale adapted for reconviction studies (Sherman et al., 2007, cited by Harper and Chitty, 2005; see Table 1). Robust research designs such as these are able to support strong inferences about causality – that the treatment or intervention was partly or wholly responsible for the observed effect. Only level 4 and 5 studies were included in the meta-analysis.

Table 1: Scientific Methods Scale adapted for reconviction studies

Level	Comparison	Description	Methods
Level 1	No comparison	Reconviction rate is reported for intervention group only	Before and after study
Level 2	Comparison with predicted rate	Actual and expected reconviction rates of intervention group are compared	Expected reconviction rates generated by Offender Group Reconviction Scale (OGRS)
Level 3	Unmatched comparison group	Reconviction rate of intervention group is compared with reconviction rate of an unmatched comparison group	Comparison of mean levels of reoffending
Level 4	Well-matched comparison group	Reconviction rate of intervention group is compared with reconviction rate of a comparison group matched on static (and dynamic) risk factors e.g. criminal history, gender	Propensity score matching; regression discontinuity
Level 5	Randomised control trial (RCT)	Reconviction rates are compared between intervention and control groups that have been created through random assignment	Randomisation

Searching and screening

The search was developed and undertaken in February and early March 2020. We drew on Newton et al. (2018) and Visser et al. (2005) to develop the following search string:

((TITLE-ABS-KEY (offender OR prisoner OR imprisonment OR parole* OR inmate* OR ex-prisoner OR jail OR criminal OR convict OR probation* OR licen*) AND TITLE-ABS-KEY (employ* OR vocation* OR "job read*" OR "job train*" OR "work train*" OR education* OR coaching OR "workplace skills" OR "work prep*" OR "work place*" OR "work read*") AND TITLE-ABS-KEY (correction* OR reoffen* OR offend* OR recidiv* OR rearrest* OR reconvict* OR incarceration OR desist*) AND TITLE-ABS-KEY (evaluation OR experiment* OR trial OR impact OR effect*) AND PUBYEAR > 1999)).*

We searched a number of databases (Scopus, Web of Science, Psychinfo, ASSIA, Sociological Abstracts and Criminal Justice Database) and identified 12,724 studies from the initial search of databases. To facilitate screening, titles and abstracts from the results were imported into EPPI Reviewer, a web-based software program for managing and analysing data for systematic reviews. After the removal of 5,968 duplicates, 7,026 studies remained for further screening. Each of these was screened for relevance on title and abstract using the PICOS criteria (see above). Titles and abstracts were screened by one reviewer and a second reviewer screened 20 per cent at random, with differences being resolved between the two reviewers with the involvement of a third reviewer where necessary.

We also handsearched¹ several journals (Probation Journal, European Probation Journal, International Journal of Offender Therapy and Comparative Criminology and the Journal of Forensic Practice) and several websites of organisations associated with criminal justice research (UK Ministry of Justice, The Scottish Government, Correctional Services Canada, Australian Institute of Criminology, US National Institute of Corrections, The Nuffield Foundation (UK), Vera Institute for Justice (US), Washington State Institute for Public Policy (US) and The Urban Institute (US)). These searches identified four further studies. Finally, we also searched the Justice Data Lab (JDL) for relevant studies and liaised with staff at the JDL to confirm that we had identified relevant studies, 18 were selected for inclusion.

A total of 86 papers (49 papers from the database search, 18 from JDL, 15 from previous systematic reviews, four from the handsearching of journals and websites) were identified for closer inspection. After further full-text screening against the PICOS criteria (for relevance) and against the Scientific Methods Scale (for methodological rigour), 32 papers were discarded because they were not relevant and/or failed to include a measure of recidivism. Eight studies were unobtainable as they were located behind web-based paywalls to which we did not have access. This left a total of 46 papers for inclusion in the review. The search strategy and subsequent screening is illustrated in a PRISMA flow diagram (Figure 1).

Analysis

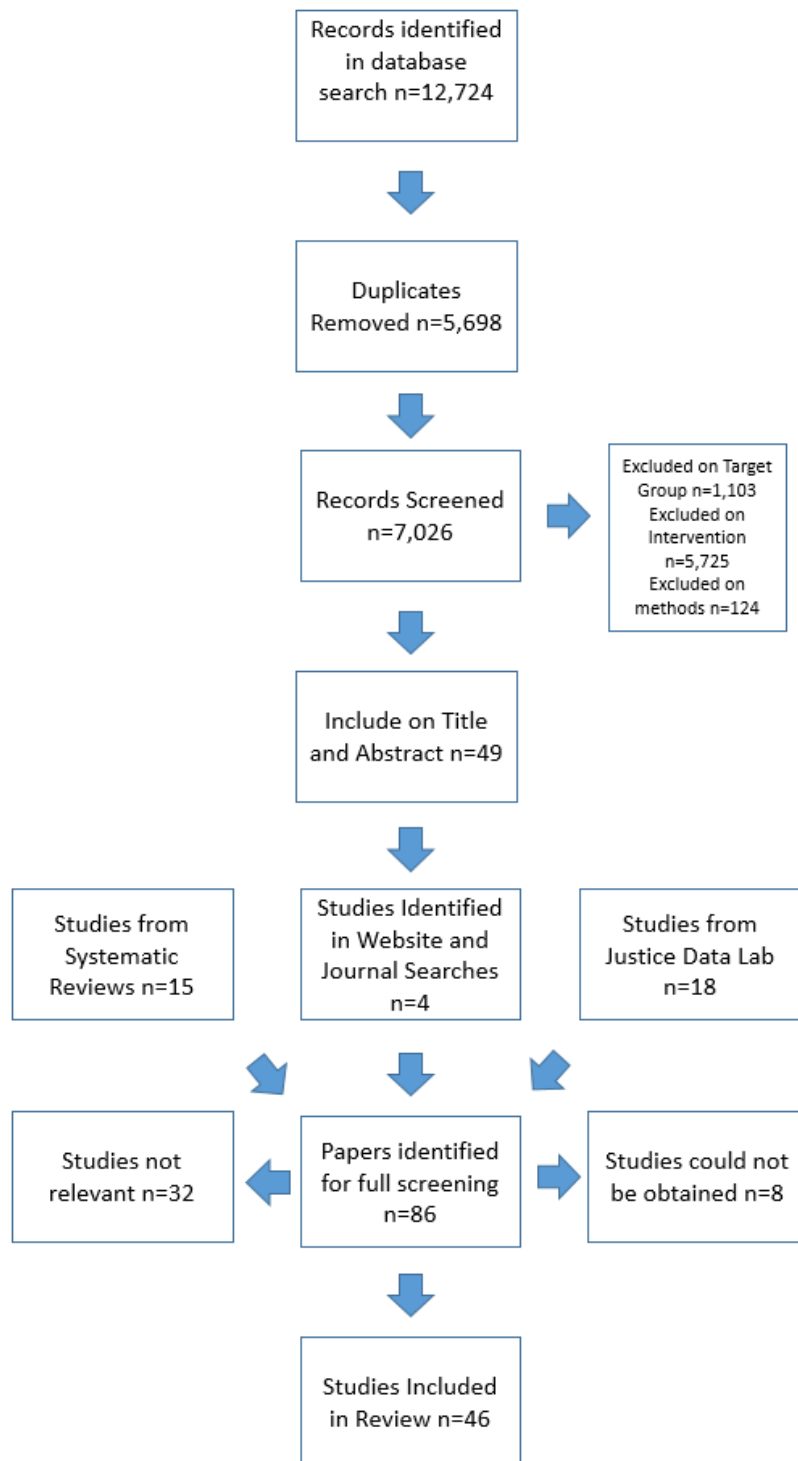
We undertook a narrative analysis of all 46 studies and then conducted a meta-analysis of the 37 level 4 and 5 studies. We restricted the meta-analysis to level 4 or 5 studies because these were studies with stronger internal validity where we could be more confident that selection bias (i.e. differences between intervention and control groups) was minimised. Two studies which were only based on female offenders were excluded from the meta-analysis in order to increase the homogeneity of synthesised studies. We also excluded two studies for which we were unable to calculate a risk ratio using their published data in a manner which was consistent with our approach to the majority of the studies. These two studies used measures (e.g. continuous measures over longer time periods) which differed those in the rest of the studies, and furthermore the data to convert them accurately was not available in the paper. Thirty three studies were therefore included in the meta-analysis.

We first conducted a risk of bias assessment on each study using the ROBINS-I tool (Sterne et al. 2016). Making judgements based on the published information available, each study was rated as being of high, medium or low risk of bias. None were assessed as being at high risk of bias. The meta-analysis was undertaken using the

¹ Handsearching did not include reference lists from studies found in databases and websites.

metafor package in R (Viechtbauer, 2010) and comprised five separate analyses:

Figure 1: PRISMA flow diagram



1. Level 4 and 5 studies (all);
2. Comparison of level 4 and level 5 studies
3. Comparison of studies conducted in the United Kingdom and the United States
4. Comparison of studies by setting: community, custodial, community and custodial

5. Comparison of different intervention types

All analyses were undertaken using a random effects model (using inverse-variance weighting) to calculate risk ratios, and restricted maximum-likelihood estimation (REML) to estimate the total amount of heterogeneity. Random effects models are appropriate when constituent studies differ in terms of mixes of participants and interventions (Borenstein et al., 2011). All analyses included an assessment of statistical heterogeneity, i.e. variability in intervention effects, quantified by the I^2 statistic, a measure of “the percentage of the variability in effect estimates that is due to heterogeneity rather than sampling error (chance)” (Higgins et al., 2020, section 10.10.2). In meta-analyses of social interventions we expect the observed statistical heterogeneity to be substantial, as it is driven by variability in the underlying studies which are likely to represent a range of interventions delivered to participant groups with different characteristics, in different locations and at different times. Substantial observed heterogeneity is also to be expected in large meta-analyses, and this observation in itself may be less problematic than assuming there is no heterogeneity (as may occur in a smaller meta-analysis in which heterogeneity may be unobserved due to the small number of studies synthesised - Kontopantelis et al., 2013). Although it is technically possible to meta-analyse studies with high statistical heterogeneity, this factor should guide the interpretation of results, such that summary (i.e. combined) effect sizes provide “modest guidance on what to expect for any given situation because the studies are so heterogeneous” (Imrey, 2020, p.2).

A range of outcome measures are used in the constituent studies, and where possible we selected an outcome measure which used a one-year proven reoffending rate, similar to that which is widely used in UK recidivism studies. Where this was not possible (i.e. because the study measured reoffending in a different way), we selected the closest outcome measure to a one-year proven reoffending rate. As none of the studies had low event rates we did not need to apply continuity corrections (Efthimiou, 2018). We calculated risk ratios for the Justice Data Lab studies based on reported headline reoffending rates and sample sizes (rather than using weighted sample sizes). For analyses involving a comparison (2,3,4) we tested for subgroup differences to determine whether grouping studies explained differences in the effect of the interventions on recidivism. For example, in the third analysis whether there was a statistically significant difference in the risk ratios for studies undertaken in the UK compared with those undertaken in the US. Given the number of studies included in the meta-analysis, we expected publication bias tests to be sufficiently powered to detect bias (Sterne et al. 2000), and therefore tested for publication bias using funnel plots and Duval and Tweedie’s Trim and Fill (Borenstein et al., 2011).

Findings

The first part of the section the 46 studies² that we reviewed in detail, and the second part the meta-analysis of the 33 studies.

Narrative synthesis

Interventions were diverse. They often contained different combinations of employment related activities, many of which were only loosely defined. It was challenging to classify interventions with precision in some cases and they often included specific activities undertaken in conjunction with others at different points, whilst targeting a range of interconnected needs. We have therefore had to make a judgment when distinguishing between interventions and deciding how to classify them. The definitions that we have employed to classify interventions are as follows:

1. Work readiness training normally covered both ‘basic skills’ (‘remedial skills’) such as basic numeracy and literacy, locating information, problem solving, and critical thinking and ‘life skills’ (‘noncognitive skills’ or ‘soft skills’) that focused on personal characteristics and behavioural skills that enhance an individual’s interactions, job performance, and career prospects such as adaptability, integrity, cooperation, and workplace discipline. Modes of delivery included class-room lessons, motivational interviewing, 1-2-1 or group counselling, coaching or mentoring.
2. Job search training and support was often a component of work readiness training, but was

² A table, summarising the 46 papers, including details of interventions, target groups, evaluation methods and headline findings is available from the authors on request.

sometimes offered as a stand-alone service and might include CV writing, interview preparation and job searching.

3. Vocational education and training included training and education linked to a particular job. It was often linked to apprenticeship schemes and often delivered partly in a class room and partly in the workplace.
4. Job placement or transitional work involved a temporary or time-limited job which might be paid or unpaid. Job placements or transitional work were often linked to a job readiness programme and often included some kind of 'wrap around care' including a job coach or case manager.
5. Prison-based work involved working in a prison workshop where an outside industry ran a part of its business (e.g. a repair workshop, an assembly line or a call centre) in a custodial setting.
6. Work coaches, job coaches or case managers are often part of a work readiness programme or part of the wrap around support for a job placement, but might be offered as a standalone intervention.
7. Income support/basic income. Some programmes (generally in the US) were accompanied by some kind of income support or basic income guarantee.

Overall, the most common intervention was work readiness training, which was found in 65 per cent of 30 studies ($n = 30$), followed by vocational education found in 54 per cent of studies ($n = 25$) was vocational education. Job search training was present in approximately 43 per cent ($n = 20$) and income support in approximately 37 per cent ($n = 17$) of studies. The least common intervention component was work or job coaches, with approximately 15 per cent ($n = 7$) of studies including this component.

A large proportion of interventions delivered in a custodial setting involved work readiness training and vocational education, whereas job search training was most common in a community setting. Slightly less than half of interventions that contained job placements, nine out of 21, were delivered in a community setting.

Certain elements of employment support were more likely to be delivered in combination. For example, 41 per cent of interventions included work readiness training and vocational education ($n = 19$) and 37 per cent ($n = 17$) involved both work readiness training and job searching. Over half (55%) of the studies published by The Justice Data Lab contained interventions comprised of work readiness training and job search training (10 out of 18 of these studies). However, a number of the Justice Data Lab studies report different implementations of the same programme model.

Almost all papers included male and female participants, however males typically made up a much larger proportion of the population. Eleven studies included male participants only, and in 12 over 90 per cent were male. The youngest study population mean age was 19 and the oldest was 39.

Some studies specified an intervention that targeted specific types of offenders. For example, Cook et al., (2015) targeted gang involved offenders. However, in the vast majority of studies offenders of all types were included with the exception of sex offenders or offenders classed as high risk of violent recidivism or those with high risk of escape. One notable offending characteristic, present in a significant number of studies, were offenders with convictions for drug and violent offences.

Different studies use different measures of recidivism. Where it was available we looked at a one year reconviction measure including for technical violations. Some studies reported on longer follow-up periods than others (periods of 12 and 24 months were most common). Studies also included different measures of recidivism such as reincarceration, reconviction, revocations or arrests. Where a one year reconviction measure was not available we report the outcome measure that most closely matches a one year reconviction measure.

Twenty-one of the 46 studies took place in community settings, 15 in custodial settings and 10 spanned community and custodial settings whereby offenders are exposed to the programme both in prison and post-release (through-the-gate). For those serving custodial sentences, employment interventions were typically

available for people six month prior to release.

Meta-analysis

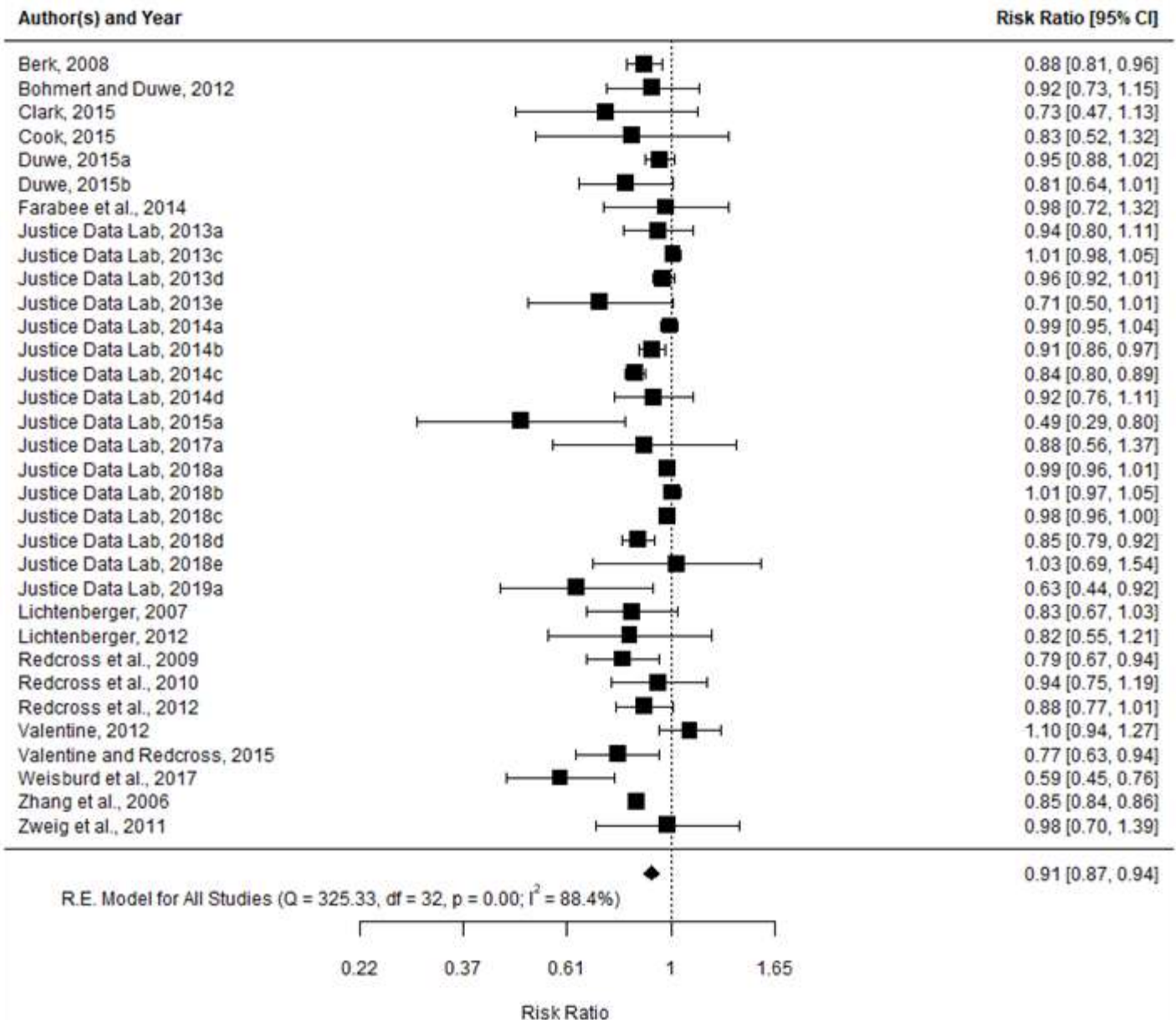
In this section we set out the results of the meta-analysis of the 33 level 4 and 5 studies. Of these 33 studies 17 were conducted in a community setting, nine in a custodial setting and seven in a mixed community and custodial setting (through-the-gate). 16 studies took place in the US, 16 in the UK and one in Israel. Twenty eight studies were of interventions based on work readiness training, or job support training, or coaching, and of these, 16 also included vocational education.

In the first piece of meta-analysis we pooled data from the 33 retained level 4 and 5 studies. The analysis shows that, on average, these studies reported a reduction in re-offending. Meta-analysis takes constituent studies' treatment effects (risk ratios in our REA), confidence intervals and sample sizes to weight them and to produce an overall combined summary effect for all the studies in the analysis. **Figure 2** is a forest plot showing the results of this analysis. The plot shows each constituent study and its associated risk ratio (designated by a black square). In the forest plot the results from the meta-analysis are represented by the diamond towards the bottom of the plot below the horizontal line. In this analysis the combined summary effect for the 33 studies is 0.91 (95% CI = 0.87 < 0.94). This indicates that the vocational training and employment programmes studied were associated with 9% fewer treated individuals reoffending than those who did not receive an intervention. The confidence interval is statistically significant and indicates that repeated analysis using a different sample of studies expect to find the summary effect to fall within the range of a 6% to 13% reduction in reoffending.

It should be noted that many of the individual studies in this analysis have confidence intervals which straddle the line of null effect, being greater than one. This suggests that replication of individual studies could find an increase (rather than a reduction) in reoffending. Nevertheless this does not nullify the fact that statistical synthesis of the constituent studies' findings indicates that it is highly probable (within a 95% CI) that a vocational training or employment programme similar to those included in this REA would be associated with a 6% to 13% reduction in recidivism for those taking part in an intervention.

Figure 2 also shows the statistical heterogeneity (inconsistency) of the studies in this analysis. This is statistically significant ($p < 0.05$) and considerable, with almost 90% ($I^2 = 88.4\%$, within a 95% confidence interval of 78.9%-96.9%) of the observed differences in results being due to heterogeneity rather than sampling error (chance). As previously stated, such high levels of heterogeneity are frequently observed in meta-analyses of evaluations of social interventions as they often include a wide range and number of studies (in terms of participants, settings and interventions). The presence of this overall heterogeneity therefore suggests a somewhat more cautious interpretation of the combined summary effect than might otherwise be made, and is explored further in the following analyses.

Figure 2. Forest plot: analysis of level 4 and 5 studies



In a second piece of analysis we compared the outcomes of the Level 4 studies with the Level 5 studies to see if study design influenced the outcomes reported. This includes the same 33 studies as the first analysis and therefore the combined summary effect is the same (0.91, 95% CI = 0.87 < 0.94). The analysis also shows that there is no statistically significant difference in results for studies that employed Level 4 as opposed to Level 5 evaluation designs. The results are displayed in **Figure 3**.

The level 5 (randomised) studies have a slightly lower risk ratio (0.90, 95% CI = 0.81 < 0.99) than the level 4 studies (0.91, 95% CI = 0.87 < 0.95), and a wider confidence interval around this risk ratio. This is likely to be due to the fact that the level 4 studies were often based on much larger samples (employing large volumes of

administrative data in Propensity Score Matching) than the level 5 studies. Nevertheless, the difference in risk ratios between the two groups is not statistically significant ($p=0.81$), and we must therefore reject a hypothesis that interventions studied by research at different Scientific Methods Scale levels are associated with markedly different effects on reoffending. Level 5 and level 4 studies are associated with different amounts of heterogeneity (41.8% and 90.9% respectively, with 95% confidence intervals of 0%-79% and 85%-98.5%). This may suggest that much of the heterogeneity observed in the first analysis may be due to the inclusion of the level 4 studies. However it should also be noted that there are fewer level 5 studies, and this in itself may be a factor in the lower level of associated heterogeneity.

Our third piece of analysis compared those evaluations conducted in the United Kingdom with those conducted in the United States (one study conducted in Israel was removed for this analysis). It suggests that, on average, US studies have achieved greater reductions in recidivism than UK studies, but this difference is not statistically significant. **Figure 4** shows the results of this analysis. The summary risk ratio for the UK studies is 0.94 (95% CI = 0.90 < 0.98). This indicates that vocational training and employment programmes delivered in the UK were associated with 6 per cent fewer treated individuals reoffending than those who did not take part in a programme (within a 95% confidence interval of 2% to 10%). The risk ratio for the US studies is lower (0.89, 95% CI = 0.84 to 0.93), suggesting reductions in recidivism in US studies were found to be 5 per cent greater than in UK studies. We caution against interpreting this difference between the two countries too strongly however as it is not statistically significant ($p=0.09$), and therefore may be an artefact of the data sampled, rather than being due to any systematic difference between the implementation of the interventions in the two countries. The UK studies are associated with considerable heterogeneity ($I^2 = 86.6\%$, with a 95% confidence interval of 76.5%-98.9%), whereas this is lower for those conducted in the US ($I^2 = 45.9\%$, with a 95% confidence interval of 0%-78.7%). However the slightly overlapping confidence intervals suggest that differences in heterogeneity between studies conducted in the two countries are not statistically significant.

Next we compared interventions delivered in custodial settings, community settings and both community and custodial settings (through-the-gate). Although we found some differences between settings in terms of reductions in recidivism, differences between settings were not statistically significant. **Figure 5** shows the results of this analysis. The overall combined summary effect is the same as the first analysis (0.91, 95% CI = 0.87 < 0.94), and there are non-significant ($p=0.25$) differences in subgroup effect sizes between studies conducted in the three settings. Studies undertaken in community and community and custodial settings are associated with statistically significant differences in recidivism (within each of the subgroups), with lower recidivism amongst individuals who had taken part in an intervention (9% and 17% respectively) compared with those who did not. Studies undertaken in the custodial settings were not associated with reduced recidivism, and the confidence interval for these studies (0.98 – 1.02) suggests that repeated analysis with different samples may identify an effect in either direction, i.e. that they either reduce or increase recidivism. In summary we caution against interpreting these findings as suggesting that interventions are more effective in some settings than others as the between group differences are not statistically significant.

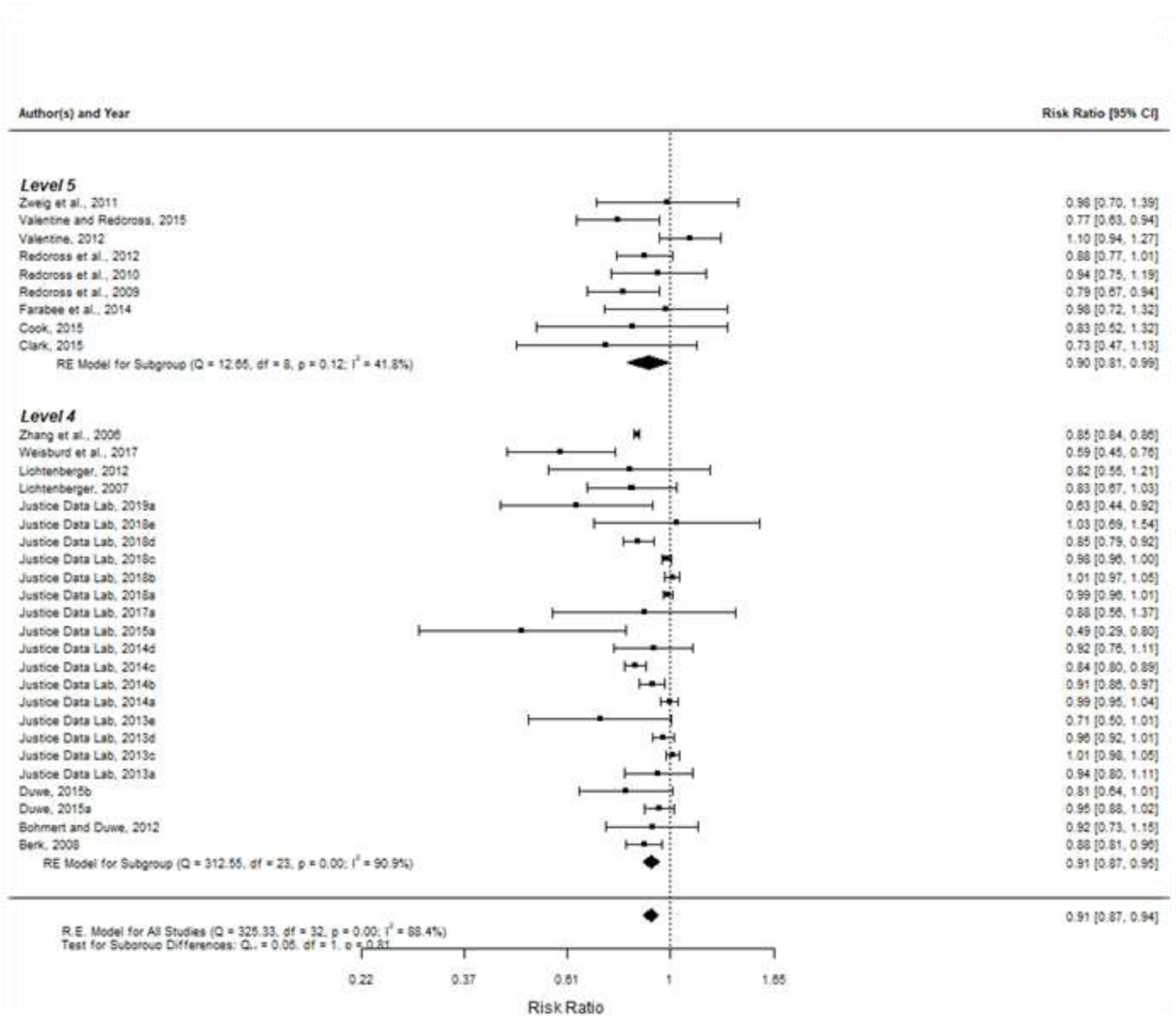
Figure 3. Forest plot: comparison of level 4 and 5 studies

Figure 4. Forest plot: comparison of studies conducted in the United Kingdom and the United States

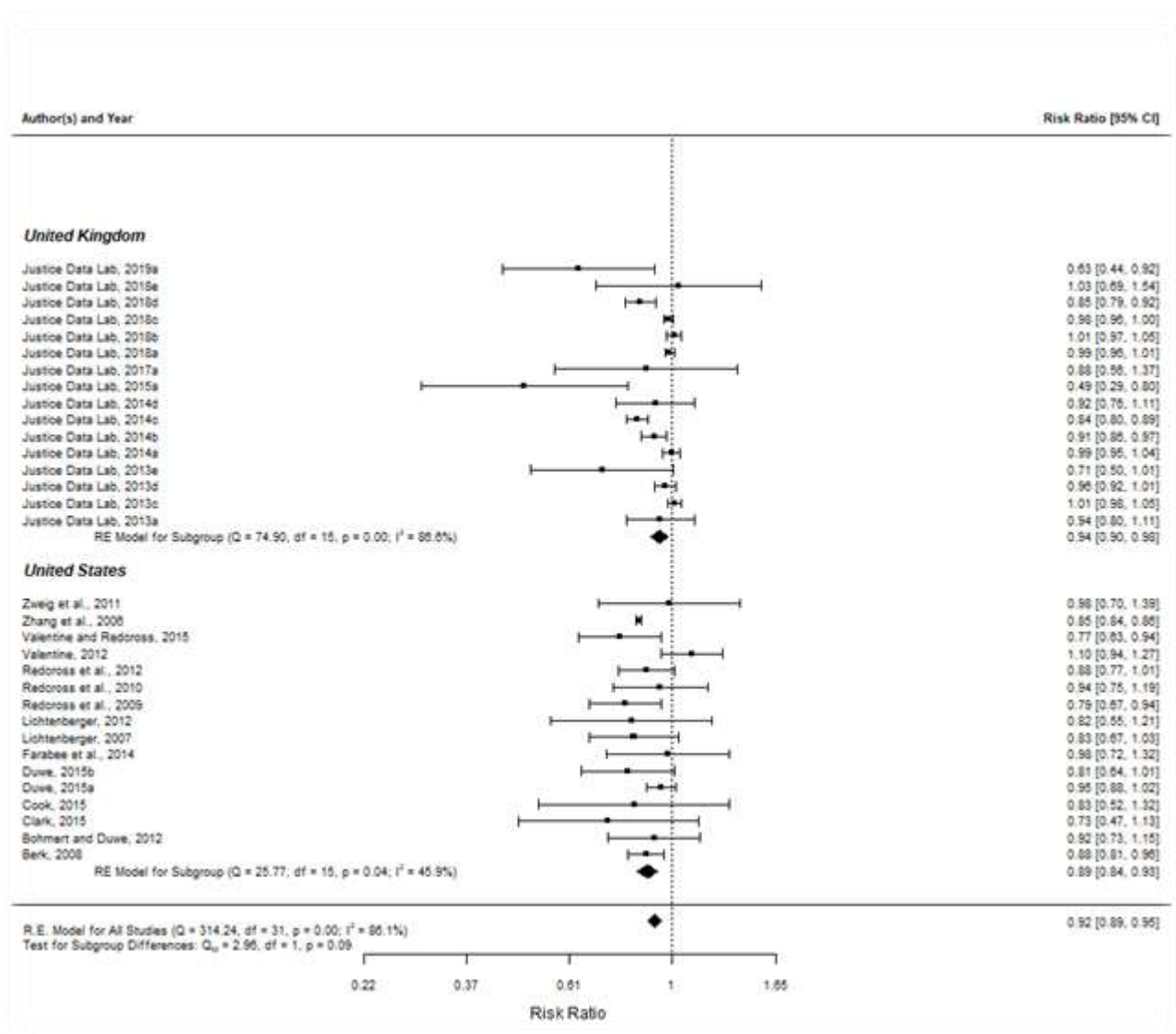
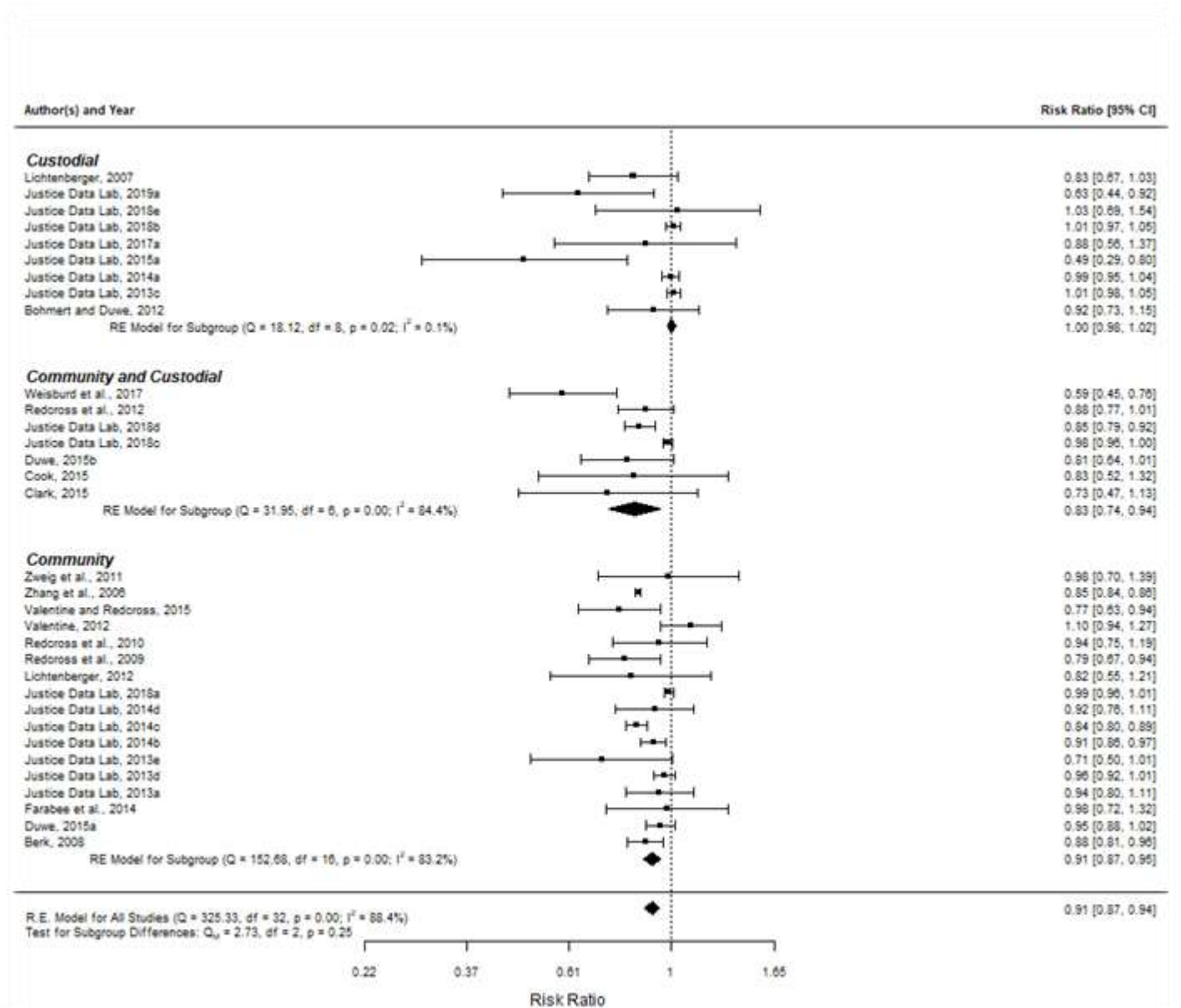


Figure 5. Forest plot: Comparison of studies by setting: community, custodial, community and custodial



The following three figures (6-8) show three separate analyses based on intervention types. As the majority of studies investigated a programme which combined a number of different interventions together (see above), it was not possible to clearly separate them for subgroup analysis. In our analysis we grouped interventions together according to commonly occurring combinations and found that all of the groups of interventions led to statistically significant reductions in re-offending, but we are not able to state whether the differences between the average effects described for each group of interventions are statistically significant.

Figure 6 is an analysis of interventions based on work readiness training, or job support training, or coaching. The summary effect for these interventions is 0.91 (95% CI = 0.88 <> 0.95), indicating that 9 per cent fewer individuals who took part in a programme recidivated compared with individuals who did not.

Figure 6. Forest plot: interventions based on work readiness training, or job support training, or coaching

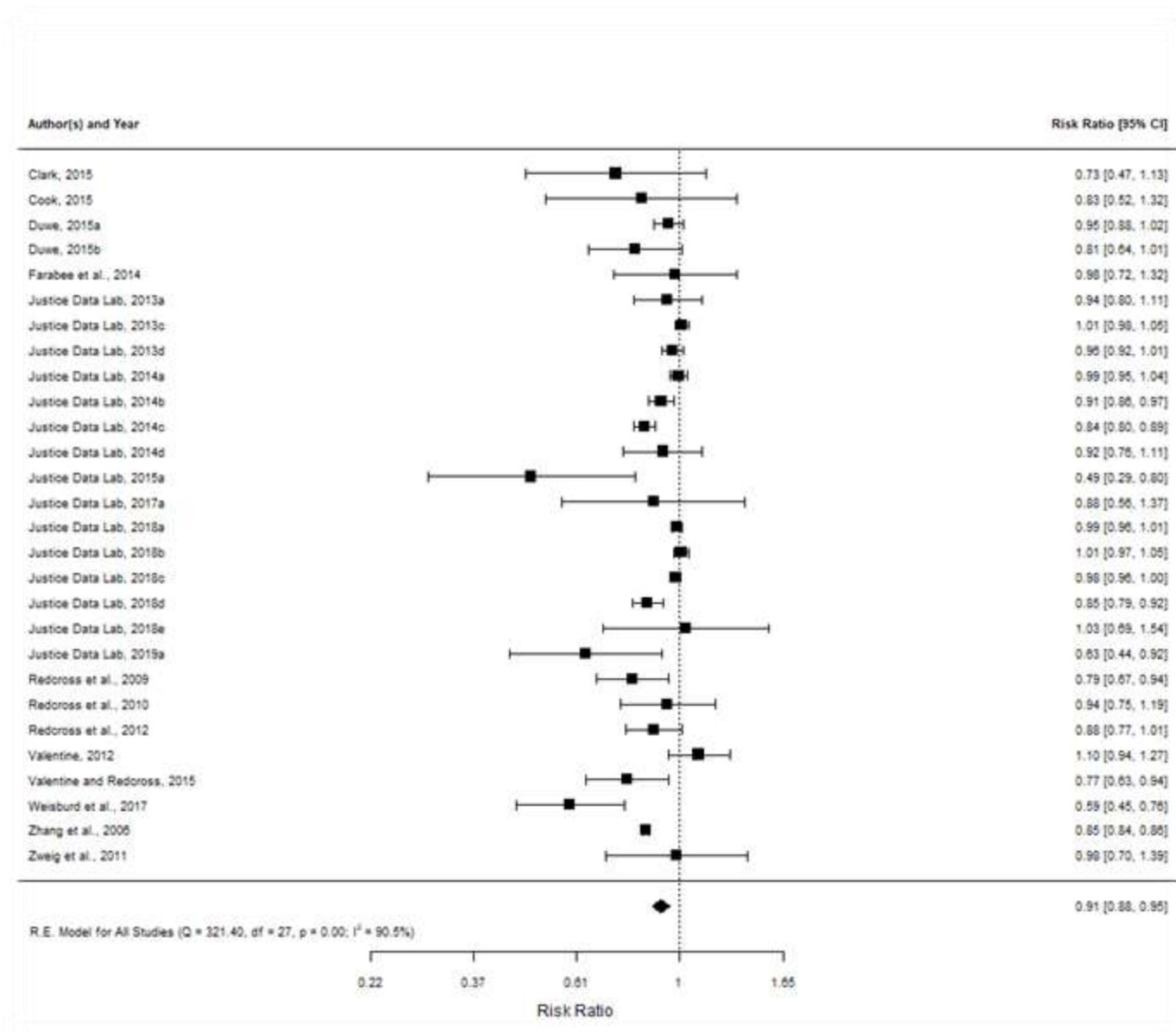


Figure 7 is an analysis of interventions based on work readiness training, or job support training, or coaching, and including vocational education. The studies in this analysis therefore all included a vocational education component, in addition to either work readiness training, or job support training, or coaching. The summary effect for these interventions is 0.93 (95% CI = 0.89 < 0.97), indicating that 7 per cent fewer individuals who took part in a programme recidivated compared with individuals who did not.

Figure 7. Forest plot: interventions based on work readiness training, or job support training, or coaching, and including vocational education

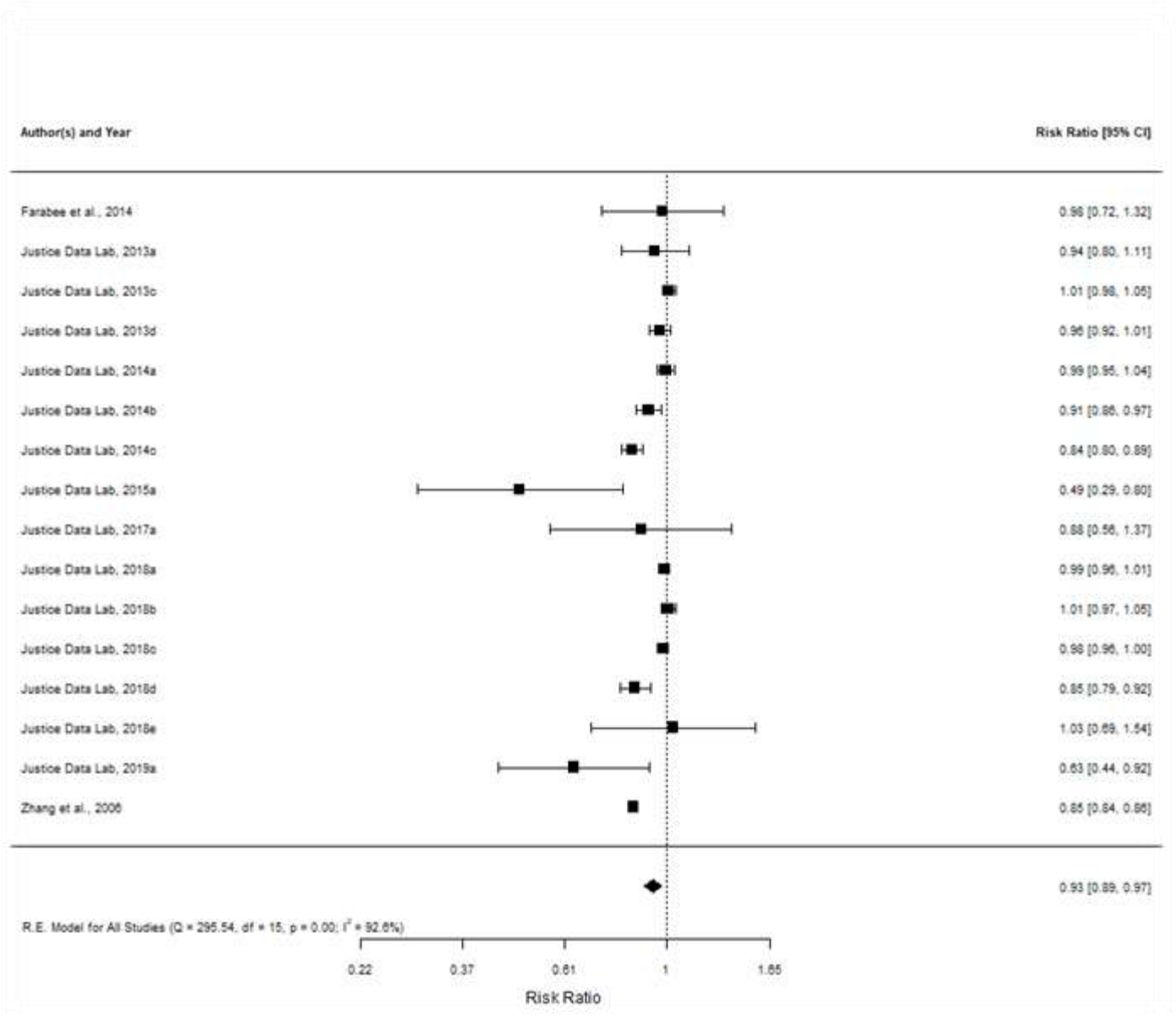
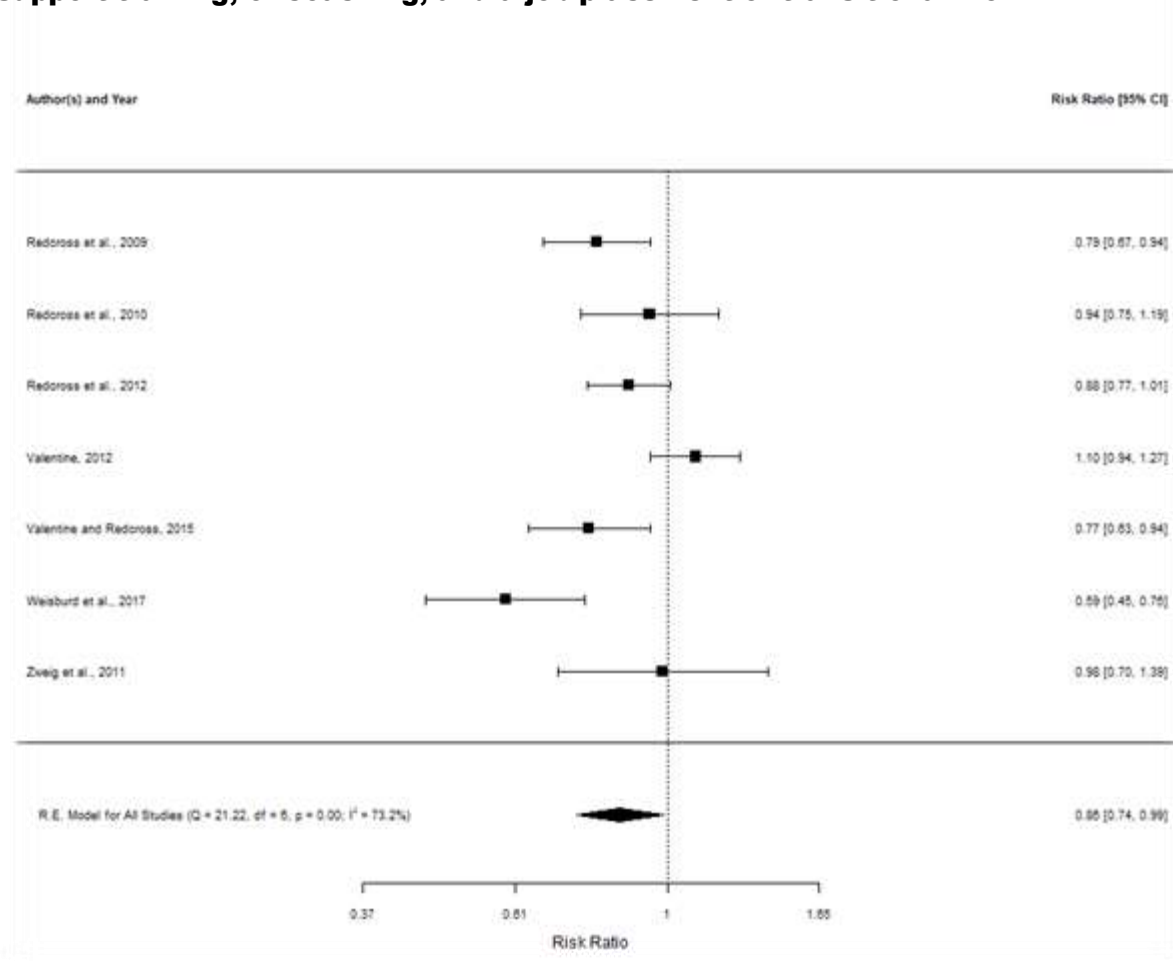


Figure 8 is an analysis of interventions based on work readiness training, or job support training, or coaching, and including a job placement or transitional work. The studies in this analysis therefore all included a job placement or transitional work, in addition to either work readiness training, or job support training, or coaching. The summary effect for these interventions is 0.86 (95% CI = 0.74 < 0.99), indicating that 14 per cent fewer individuals who took part in a programme recidivated compared with individuals who did not. The confidence interval around this summary effect is comparatively wide, and this may be at least partially explained by the smaller number of studies in this analysis.

Figure 8. Forest plot: interventions based on work readiness training, or job support training, or coaching, and a job placement or transitional work



The analysis of intervention combinations therefore found that all three combinations of interventions analysed were associated with statistically significant reductions in reoffending. Whilst it might be suggested that the additional effect of incorporating a job placement or transitional work (over and above work readiness training, or job support training, or coaching) is associated with an increased reduction in reoffending, we caution against this interpretation for two reasons: i) many interventions included overlapping and difficult-to-differentiate components, and ii) therefore we have not been able to undertake a statistical subgroup analysis which would clearly indicate the magnitude of the differences between different types of intervention and their statistical significance.

Tests for potential publication bias. Studies included in a meta-analysis may be biased by virtue of having been published. One source of potential publication bias exists because studies which report high effect sizes are more likely to be published (and therefore included in meta-analyses) than studies which report low effect sizes (Borenstein et al., 2011). To determine whether this might have been a problem in our analysis we carried out some tests for publication bias. Figure 9 below is a funnel plot, and shows an asymmetric distribution of studies about the mean effect size, indicating that there is potentially some publication bias inherent in our analyses. Figure 10 shows an attempt to calculate an unbiased estimate of the effect size using Duval and Tweedie's Trim and Fill (Borenstein et al., 2011), which uses imputed studies. This method is based on assumptions about why studies are missing, but taken on face value suggests that our analysis may be over-estimating the overall reduction in recidivism by 3%. However, if this were true then it would not greatly affect our findings.

Figure 9

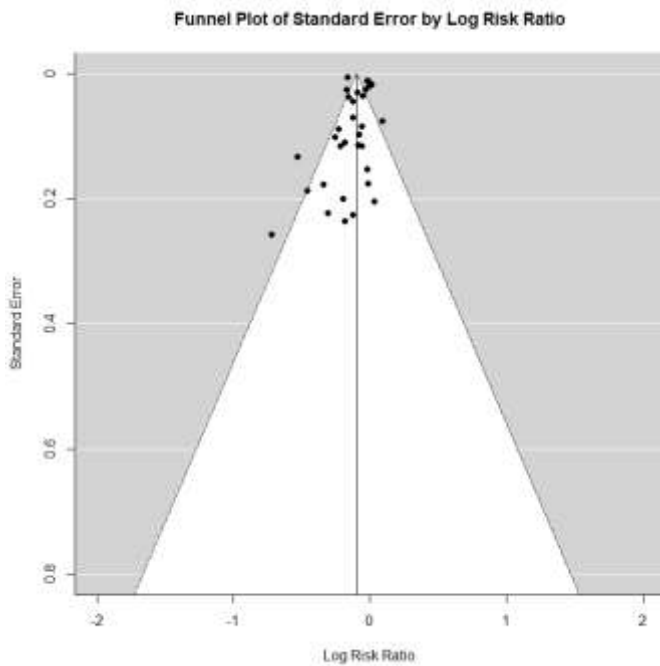
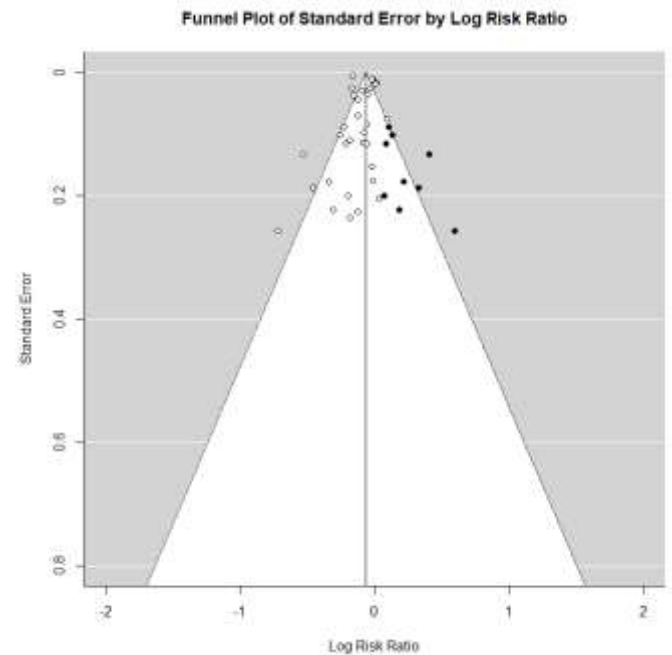


Figure 10



Conclusions

This review has identified a larger number of studies of the impact of community and custody delivered vocational training and employment programmes on reoffending than previous reviews. This is for several reasons. First we include both custodial and community settings whereas some previous reviews focused on one or the other. Secondly, we have included both experimental and some forms of more rigorous quasi-experimental evaluations where some previous reviews have only considered randomised controlled trials. Thirdly, and linked to the second point, we have included a number of UK studies, all quasi-experimental designs, that have not been included in previous studies. The majority of the evidence comes from studies that employ well-matched comparison groups where a recidivism measure for an intervention group is compared with the same measure for a comparison group matched on a range of risk factors. Only 10 out of 46 studies reporting a recidivism outcome are randomised controlled trials, all of which were conducted in the United States, and there is a need for such studies to be undertaken in the UK.

Unlike previous reviews (Visser et al. 2005, Newton et al. 2018) we have undertaken a meta-analysis of the studies with the highest levels of internal validity. The meta-analysis includes studies of related, but distinct intervention types, undertaken in a range of settings. The meta-analysis identified a large amount of statistical heterogeneity in the majority of our analyses. This in itself is not surprising when undertaking synthesis of studies of social interventions conducted across a variety of settings, interventions, populations and measures, and where a large number of studies are included in the synthesis. These differences between studies and the statistical heterogeneity observed in the meta-analysis suggest we should be cautious about the conclusions that we draw, and that our overall findings are a guide to what might be observed (Imrey, 2020) in any given implementation of a vocational training and employment programme.

One strength of our review was the number of studies included. This is particularly relevant when doing tests for publication bias as they are likely to be sufficiently powered to detect bias. In our synthesis they suggested that some bias may be present, but nevertheless meta-analysis of a subset of the most methodologically robust studies found that vocational training and employment programmes were associated with fewer programme participants reoffending, when compared with nonparticipants (around 9% fewer, not accounting for a possible marginal effect of potential publication bias). Studies conducted in the UK were associated with 6 per cent fewer programme participants reoffending (again, not accounting for a possible marginal effect of publication bias). These findings are statistically significant, but the analysis also highlighted that despite this finding, individual programmes may also be associated with increases in reoffending. This finding provides some support for policy-makers to continue to implement such programmes. We did not find any significant differences between studies

undertaken using different methodologies. Interventions spanning community and custodial (e.g. through-the-gate) settings were found to be associated with lower levels of recidivism than community-based and custodial programmes, but these differences were not statistically significant. This may however signify an area of interest for further research.

We were unable to offer a robust meta-analytic comparison between different types of intervention due to constraints around definition and differentiation of types of vocational training and employment programme in the synthesised studies. This though points to a broader strategic consideration; that evidence synthesis is supported by systematic programmes of research (including replication studies) as the basis for generating a body of evidence to understand what works. Thus, policy initiatives should be supported by rigorous, counter-factual evaluations of interventions. Reports of those studies should pay greater attention to describing the precise nature of the intervention(s) that are tested to facilitate later reviews of the evidence. In this way policy that is more evidence-informed can be developed.

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